

Human Genetics as a Science, as a Profession, and as a Social-Minded Trend of Orientation¹

FRANZ J. KALLMANN

New York State Psychiatric Institute, Columbia University, New York, N. Y.

EVERY scientific society in good standing treasures its share of expert statisticians and semantically-minded purists, and the American Society of Human Genetics is no exception. Consequently, there is still some disagreement as to whether this is the fourth or the fifth anniversary of our Society, although its first public appearance is known to have taken place in 1948. According to the purists, the term "anniversary" refers to the recurrence in each year of the date of an event. It seems, however, that our founders failed to register a precise birthday as the event to be commemorated. It is certain only that the Society is still prodigiously young, and that this is its fifth annual meeting, and the first official dinner meeting. It is undeniable, too, that the choice of an appropriate topic for this festive occasion has not been an easy task.

Retrospectively, I may be inclined to concede that the selection of a nutritive topic for this address was almost as difficult as that of helping to guide toward maturity an organization still afflicted with a few minor growing pains. In allegoric terms, the roots of my dilemma might be compared with the embarrassment of a professional baseball player who, in football, never advanced beyond the status of a substitute on his college team, but at a class reunion found himself elected to speak in celebration of this team's championship record. If one prefers to describe the difficulties of the original assignment in a more direct way, one might point to those liabilities awaiting the wearer of a bright-colored cap of maintenance, embellished with the feathers of such noted pioneers of human genetics as H. J. Muller, Laurence H. Snyder, and Lee R. Dice.

It is conceivable that a few compensatory and possibly non-negotiable assets might have been derived from those benefits, which were apt to accrue from the specialized training of a psychiatrist. For instance, certain aptitudes as evolved by that training might have been helpful in an effort to search for a selected assortment of hidden personal motivations behind the solid scientific achievements of my honorable predecessors. Apparently, playful indulgence in such personalized research procedures is rapidly developing into a favorite pastime of some of our fellow scientists. In my special emergency situation, however, there was little likelihood that even the most subtle disclosures would have

Received September 2, 1952.

¹ Presidential address delivered at the fifth annual meeting of the American Society of Human Genetics at Cornell University, Ithaca, New York, September 9, 1952.

saved me from being classified as just another geneticist. As you know, the given classification is still likely to be identified with that sinister version of a reactionary, who is eager to displace despondent sentiments of fatalism and wishful incredulity as symbolized in India by the worship of Siva, the Destroyer. I readily decided, therefore, to approach my topical problem with a straight appraisal of the actual contributions of the three men who had preceded me in office, rather than with a problematic dissection of their personalities.

Pursuing my task in the order of precedence, I had no difficulty in rating our first president, a prominent Nobel Prize laureate, as the man whose experiments on mutant genes had set an everlasting milestone in establishing genetics as a *science*. His leadership attracted outstanding scholars from many different disciplines rightfully concerned with the biology of human health, and he thereby succeeded in laying the foundation to a safe upgrowth of this Society. In line with the unique results of his life work, the message of his presidential address (1950) culminated in a piercing appeal for the recognition of mutation as an alarming cause of disease in man, forever securing his place among the leading scientists of our time.

Equally unchallenged was the choice of our second president as that of an educator, who had carried the torch in the *professional* advance of our discipline. Because of his remarkable success in elevating human genetics to its deserved academic position within the biological sciences, it was entirely fitting that the term of his presidential office coincided with a banner year in the history of modern genetics, the year of its fiftieth anniversary. In commemorating this special occasion with a penetrating account of old and new pathways in human genetics (1951), Dean Snyder's plea for cooperative teamwork in the exploration of human heredity ranked as one of the keynote speeches of the Golden Jubilee of Genetics at his old Alma Mater (Dunn, 1951). From the standpoint of our discipline, the speech tendered a memorable testimonial to the emergence of human genetics as a full-grown profession.

The plainest description of the individual contribution, which typified our venerable third president, was set forth in his high-principled Minneapolis address, entitled "Heredity Clinics—Their Value for Public Service and for Research" (Dice, 1952). With his election, a sincere tribute had been paid to the accomplishments of a competent and conscientious worker, whose concern with the general health aspects of human genetics stemmed from upright devotion to *public service*. His professional orientation had been social-minded in the truest sense of the word, since he always believed in the public responsibilities of our discipline. His call for well-staffed heredity clinics in every state was founded on abounding experience and a scrupulously blueprinted scheme, as he had pioneered in the organization of one of the oldest and most effective genetics departments in the country. In his scheme for district

heredity clinics, the same emphasis was placed on the genetics of superior health and superior mental ability as on the study and care of inherited pathological traits. The functional design of this plan served ably to formalize what seemed to be one of the most creditable objectives of our Society.

When I reached this point in appraising the academic credentials of our principal authorities, it was apparent that the first goal of my own report was to be that of creating a general atmosphere, which would be tempered by a gentle blend of sympathetic and empathic *tolerance* on the part of the membership. The fundamental triad of scientific endeavor, professional competence and social-minded purport had been imprinted on our statutes, and little seemed to have been left that should have been said or might have been done.

In preparing this report, I was tempted for a short time to dwell on the need of giving priority, in man, to the mutative effects and selective values of *mental* traits, apt to be subject to the same genetic principles as demonstrated for scores of essential physical potentialities. However, such a topic of psychiatric coloring was certain to reopen the door to that hoax of a dualistic setting, which contributed so heavily to a crippling division in other scientific disciplines. In fact, the urge to maintain a dichotomy of body and mind seemed almost as harmful as that of splitting a personality, and I soon remembered that psychiatrists were trained to cure schizophrenic phenomena rather than to provoke them.

An antidotal alternative to dualistic discord presented itself in the idea of a concentric drive toward unified progress and intradisciplinary harmony or, more specifically, toward a triadically coordinated approach to a strong and single-minded discipline of human genetics. There was little doubt that we were marching along the proven pathways of scientific pursuit, professional prowess, and social conscience. What remained to be achieved, however, was the forging of a solid band around the various groups of specialists combined in the Society—a band of *friendship* emboldened by *singleness of purpose*.

For obvious reasons, our members had come from many different branches of science; from biology and mathematics, from psychology and medicine, from anthropology and the social sciences. Most of these fellow members earned a living in professions far removed from experimental genetics as studied in plants or animals. A majority had spent years of plodding hardship in militant minority groups within their particular specialties, and some of us had grayed in holding the fort against a tide of overenthusiastic generalizations derived from pseudo- or supertotalitarian beliefs in the self-perpetuating or government-directed omnipotence of human cultures. It was understandable, therefore, that the spirit which prevailed in this Society during the first few years of its existence gravitated in the direction of intellectual individualism mixed with pronounced caution.

However, when it is time for cadres to form an army, final victory depends

on the acceptance of a *common cause* and a *common emblem*. Since a certain lack of imagination has made me rather pragmatic and generally susceptible to notions of economy, at least in societal affairs, I was led to believe that the problem of an emblem might partly be solved by establishing the precedent of an *annual dinner*. This was the reason why a dinner meeting was arranged at Prudence Risley Hall. Evidently, its immediate purpose was to afford our members an opportunity to meet in pleasant surroundings and therein to talk of our common cause. It also was my hope, of course, that the atmosphere of good fellowship created by a good dinner might be helpful in generating the previously solicited attitude of indulgent gentleness toward presidential reports.

Strictly in terms of the future solidarity of the Society itself, it may not be too important at this point whether it will actually be feasible to uphold the expedient of an annual dinner long enough to let it grow into a truly emblematic tradition. In no respect will it be possible, however, to question the need of building a well-fortified platform for the conduct of our *common cause*.

This statement does not mean that we have not always had a good cause or have not always been aware of it. Nor should the plan of a good *societal platform* be interpreted in the sense of that politically-minded train conductor who used to tell his passengers that "a platform is to get in on—not to stand on." The platform to be built by us should be for every old member to stand on, and for many new members to get in on from the various specialized disciplines interested in the genetics of human health. It should be steadfast, and at the same time sufficiently wide to function like a bridge: A bridge over intra-disciplinary diversities, real or imaginary; a bridge over interdisciplinary dividing lines, visible or invisible; in short, a bridge leading to unity and prosperity in the one field of interest which we all have in common, *human genetics*.

In a detached approach to the understanding and management of potentially disruptive lines of division, one would be in error to over-rate *intra-group diversities* derived from different temperaments, talents and personalities or those derived from differences in educational backgrounds, personal attachments and taboos. In line with general genetic principles, such diversities exist in every human group which is formed for purposes of specialization or socialization. Fortunately, they abound in this organization, too. Without diversities of this kind, we would fail to disagree, and a society lacking differences of opinion is certain to stagnate and to disintegrate, at least in an imperfect reality.

Other dividing lines within our discipline, usually more apparent than real, are cast by the shades of *professional sensitivities* precipitated by conditioned defense reactions to presumably organized hypocrisy. The apparent need of such self-protective designs is traceable to the fact that we are late-comers in

the boundless field of public health and, therefore, are beginners in the skills required for competing in a vast and frequently shifting area of operation.

The crux of joining very old professions such as medicine, which is proud of being no longer merely an art but principally a science (Bauer, 1952), is likely to be intensified by an early realization that the natural expansion of our total field of activity does not preclude the necessity of prolonged efforts for every square inch of its conquest. The impact of this experience easily leads to feelings of ambivalence or to slightly distorted concepts regarding the size of our competitive share apportioned as a premium for cooperation with other sciences. In consequence, many of our research workers tend to lean toward academic skepticism and professional superspecialization, frequently expressed in the form of a *pessimistic* preference for the tools rather than the prospective beneficiaries of our investigative work.

Since geneticists are generally as human as the immediate objects of their research interests, one may concede that timid withdrawal into sheltered laboratories is a tempting alternative to the threat of being drawn into a whirlpool of crusading campaigns purporting to serve the needs of public health. However, general health and preventive medicine are apt to be *community affairs*, irrespective of the fact that the individual physician must think of medical care as his primary duty and largely in terms of the recovery of the patient who is ill (Master, 1952). From the standpoint of public health, therefore, the prudish pessimism of a fact-finding research geneticist is liable to create the impression of a cynical defense modality (Janse de Jonge, 1952) and, by way of paraphrasing a dictum of Heidegger, appears like a non-authentic way of human life or of a science dealing with the secrets of human life.

No redundancy is necessary in acknowledging the truism that a strictly scientific search for the facts and potential implications of human heredity will always be our chief objective. On this basis it should be clear to us, however, that the purpose of knowing the "Secrets of Nature" is not to establish some absolute value which can be dissociated from man's emotion or, in the words of Sherrington (1951), which can be applied without "altruism as passion." In a biological science such as human genetics, rationality is "a tool for thinking" rather than "mere worship of Reason." It is disillusioning to deal with human problems in an entirely abstract manner, and little can be gained by a science of human genetics which neglects the *human element* or the import of *altruism* as "the greatest contribution made by man to life."

In order to satisfy what Sherrington called our "inalienable prerogative of responsibility," we should make certain in the training of future workers in human genetics that adequate understanding of human behavior and a profound sense of social obligation be given equal rating with scientific skill and scholarly ingenuity. Without empathy toward the phenomena of human im-

perfection, human decency and human apprehension, we may be successful in making scientific contributions to the advance of an increasingly specialized knowledge of man's heredity, but we would not succeed either in communicating or in applying that knowledge (Kelly et al., 1952). In particular, we would often find ourselves at odds with the growing tendency of modern societies to sacrifice family pride and individual independence for the impersonal gift of mutual security provided by a formalized version of the welfare state (Alexander, 1951).

Fortunately, there is no reason for assuming that a well-trained student of human genetics cannot at the same time be *social-minded*, *professionally competent*, and *scientifically proficient*. The need for skepticism in this respect is refuted by the history of biology and by the records of enlightened humanitarianism made by scores of great biologists. It has long been possible and, I hope, will always remain possible to specialize in one of the life sciences without acquiring the psychology of a "microcosmic" world, recently described as the state of mind of a distrustful biologist distinguishing himself by a high degree of resistance to lollipops and the social sciences (Bates, 1952). For instance, a student of biology should be able to learn both the principles of mathematical statistics and the mechanics of working a punch card machine in connection with people's measurements and correlation coefficients, without being in danger of losing humility or the broad perspectives of human frailty and faith.

If one chooses at this point to record a factual issue of potentially instructive significance, Bates (1952) has probably been correct in observing that in comparison with biology "the science of medicine reflects in some measure the unity of the profession of medicine." Historically, it also is safe to infer that the organizational problems of biology have been "different from those of chemistry or medicine." It is doubtful, however, that the successor of medical men in maintaining a united professional front can be attributed chiefly to their desire "to keep up with the lawyers, bankers, soldiers and so forth."

Even if this utilitarian explanation is offered only as a fact-trimming attempt at oversimplification, it utterly underrates the traditional fact that competent physicians have been unified by *the idea of a common cause*. The skeptics among biologists and other groups of scientists may be disinclined to trust the earnestness or the originality of that cause. However, the price to be expended for their disbelief will be costly and comparable to the one exacted by indifference to pressing community affairs. According to Plato, the penalty paid by good men for refusing to take part in government is to live under the government of bad men. By analogy, one may expect that the qualifications of scientists and practitioners, working in a branch of medicine during a certain era, will be determined somehow by the reliance placed by their contemporaries on the Hippocratic ideal of a "universal language of the heart" (Johnstone, 1951).

It is contrary to this essential principle to view problems of human health or disease with irreverence towards the "love of man" (Greer, 1952).

In the evolution of a strong and widely trusted discipline of human genetics, we must be ready to take the same *burning pride* in our responsibility for the major purposes and central problems of human beings and their societies, that has long been considered to be a vested privilege of good medical men and good public health workers. It would not be reasonable to contend that profundity in the understanding of predominantly medical problems of human heredity is contingent on some special technical aptitudes fostered by medical training. I am of the opinion, however, that without trust in the ethical equivalents of Hippocratic ideality, neither a medical nor a non-medical specialist can be certain of applying his expert knowledge of human genetics in a productive manner, that is, in a manner "applicable to the extension of life and to the improvement of productivity during life" (Lemkau, 1952).

If a broad moral platform is adopted for the discharge of the social and professional responsibilities of our discipline, it will not only be helpful in rallying a multitude of specialized groups around a common cause, but it will serve to vitalize the *general appeal* of our cause. The prospect of taking an active part in such a promotional scheme may not seem attractive to a scientist, who is glued to a microscope or is brooding over the structural essence of life. In view of the growing complexity of human societies, however, it is apparent that our chance of inducing the employment of sound biological principles in future population and public health policies will depend on the efficacy of our joint promotional plans and endeavors.

In my humble opinion, it will be advisable to organize societal drives in several directions. Apart from the emphasis which should be placed on improving the general *humanization* and *comprehensibility* of genetic theories as applied to man, much attention should be given to the careful *selection* and systematic *training* of future workers in human genetics. As is true for any other group of specialized guidance workers in the field of public health, a genetic counselor should be selected from the standpoint of both professional qualifications and personal integrity. While in training, he should have ample opportunity to gain practical experience in dealing with people in distress, and he thereby should be taught to broaden his frame of reference from genetic to human problems. He should learn in practice rather than from books that there is no stereotyped formula in any sector of genetic counseling work, on which he can automatically rely for appraisal of the degree of a person's maladjustment within the social setting in which that person lives (Stokes, 1952). It is regrettable, therefore, that little progress has been made in the organization of a diversified post-doctoral fellowship program for the training of qualified biologists, psychologists and medical men who are desirous of specializing in human genetics.

The aim of another line of promotive effort should be to make certain, and to make known among professional workers with a potential interest in human genetics, that their participation in the activities of this Society not only is feasible, but is *welcomed* by all of us with open arms. Considering the magnitude and the multiplicity of the scientific and professional tasks ahead, we are likely to derive a more substantial gain from a liberal membership policy centered on the qualities of professional competence and social consciousness than we might from a poorly concealed trend toward an inbred fraternity of pure-line scholars. If we want to take our place in the big family of professional confederations concerned with human welfare and public health, we will need the scientist as well as the medical practitioner, the psychologist as well as the statistician, the specialist as well as the family physician. It is obvious, too, that this all-inclusive scheme of cooperative organization should find its noticeable reflection in the *editorial policies* of the standard bearer of this Society, the American Journal of Human Genetics.

Of similar importance is a set of promotive objectives relating to a question, which is likely to be raised especially with reference to the economics of our long-term research and public health activities. The question concerns the *practical value* of our work and, even if sometimes biased or otherwise distorted, should not be ignored by us. Fortunately, the woodlands to be covered by our discipline are so full of valuable trees that no real difficulty is created by any question conveying a complaint about the forest's dearth of visibility. The only difficulties which could possibly be harassing in this respect are those which may arise either from some preconceived notions of our own making or from a timid failure to lay sufficient stress on the *positive health aspects* of human heredity.

It is a plain but easily misjudged fact that in relation to human health and personality development, hereditary influences are thought of as static, while environmental influences are believed to be amenable to almost infinite manipulation. Actually, there is no single force in man's life and struggle for existence, which is more powerful, more dramatic or more inspiring than the one derived from the *dynamics of human heredity*.

It would be useless to deny that serious *pathologic* deviations may be produced by certain mutant genes. It is also true, however, that the prevention or therapeutic correction of the resultant condition will be aided immeasurably by an adequate understanding of the alternative functions of the normal and mutant genes involved. It is equally correct to state that the *main elements* of heredity are inseparable from man's evolutionary advance, from his adaptive strength, and from his hope for continuous posterity and future welfare.

As a *science*, therefore, human genetics is basically identified with a belief in orderly patterns of progress and evolution, and is apt to act as an antidote to the excitement of rebellious anguish, revolutionary destructiveness or supernatural symbolism in frustrated people. In other words, genetic knowl-

edge casts light on certain limitations of the human status, but it throws no gloom on any endeavor directed toward superhuman development.

As a *profession*, workers in human genetics are compelled to advocate a coordinated approach to the totality of human organisms as indivisible entities. In the organized management of problems of general health, culture and prosperity, they aim at giving encouragement to a person's feeling of responsibility for his own self, without fostering any tendency to independence of the group criteria of good and bad. In fact, the basis of genetic work in man is interlinked with the concept that the family is indispensable as a biological, social and educational unit.

As a *general trend of orientation*, familiarity with the principles of human genetics does not suffice to insure immunity from cliché generalizations or excess emotions as regards universal imperfections of human existence or the deeper meanings of human inequality. Some of this knowledge is certain, however, to be beneficial in forming such constructive ideas of health, sanity and social order, as may flow from realistic images and a laborious search for lasting values.

Hence, since truth is considered to be the daughter of Time, we should have no hesitation to expound genetic phenomena in man as a potent safeguard of *public health* and as a token of *promise for the future*.

REFERENCES

- ALEXANDER, F. 1951. *Our Age of Unreason; a Study of the Irrational Forces in Social Life*. Philadelphia: J. B. Lippincott.
- BATES, M. 1952. Where is biology? *A.I.B.S. Bullet.* 2: 15-17.
- BAUER, L. H. 1952. Medicine and the problem it faces. *N. York State J. M.* 52: 1806-1808.
- DANFORTH, C. H. 1923. The frequency of mutation and the incidence of hereditary traits in man. *Eugen., Genetics and the Family*. 1: 120-128.
- DICE, L. R. 1952. Heredity clinics: their values for public service and for research. *Am. J. Human Genet.* 4: 1-13.
- DUNN, L. C. 1951. *Genetics in the 20th Century*. New York: Macmillan Co.
- GREER, A. E. 1952. Evolution of medicine. *J. Am. M. Ass.* 148: 103-105.
- JANSE DE JONGE, A. L. 1952. The psychology of pessimism. *Folia Psychiat. Neurol. at Neurochir. Neerl.* 55: 20-41.
- JOHNSTONE, R. T. 1951. Medicine can bridge the sullen tide. *J. Am. M. Ass.* 147: 911-913.
- KELLY, E. L. et al. (Committee on Relation between Psychology and the Medical Profession). 1952. Psychology and its relationships with other professions. *Am. Psychologist.* 7: 145-152.
- LEMKAU, P. V. 1952. Toward mental health. *Mental Hyg.* 36: 197-209.
- MASTER, A. M. 1952. The problem of medicine. *N. York Med.* 8: 16-29.
- MULLER, H. J. 1950. Our load of mutations. *Am. J. Human Genet.* 2: 111-176.
- SHERRINGTON, C. 1951. *Man on his Nature*. Cambridge: The University Press.
- SNYDER, L. H. 1951. Old and new pathways in human genetics. *Am. J. Human Genet.* 3: 1-16.
- STOKES, W. R. 1952. The concept of emotional maturity as related to marriage counseling. *Marriage and Family Living.* 14: 127-130.